

WHAT IS CLAIMED IS:

1. A suture material comprising an isolated, modified nucleic acid.
2. The suture material of Claim 1, wherein 5 the suture material comprises at least 50% modified nucleic acid by weight.
3. The suture material of Claim 1, wherein the suture material comprises at least 50% modified nucleic acid by volume.
- 10 4. The suture material of Claim 1, wherein the modified nucleic acid is modified in at least one manner selected from the group consisting of: capping, crosslinking, methylation, ethylation and attachment of a protein or small molecule.
- 15 5. The suture material of Claim 1, wherein the modified nucleic acid comprises at least 95% DNA per total nucleic acid.
6. The suture material of Claim 1, further comprising a biodegradable copolymer.
- 20 7. The suture material of Claim 6, wherein the biodegradable copolymer is selected from the group consisting of: polylactic acid, polyglycol alginate, polyglycolic acid, poly amino acids, polysaccharides, cellulose acetate, hyaluronic acid and collagen.

8. A method of making a suture material comprising:

isолating a nucleic acid;
modifying the nucleic acid; and
5 forming a nucleic acid filament.

9. The method of Claim 8, wherein the nucleic acid comprises at least 95% DNA per total nucleic acid.

10. The method of Claim 8, wherein the modifying comprises at least one technique selected from 10 the group consisting of: capping, crosslinking, methylation, ethylation, and attachment of a protein or small molecule.

11. The method of Claim 8, wherein forming the filament further comprises:

15 extruding the purified nucleic acid through a spinneret; and
drying the extruded nucleic acid.

20 12. The method of Claim 8, further comprising adding a biodegradable copolymer to the modified nucleic acid.

25 13. The method of Claim 12, wherein the biodegradable copolymer is selected from the group consisting of: polylactic acid, polyglycol alginate, polyglycolic acid, poly amino acids, polysaccharides, cellulose acetate, hyaluronic acid and collagen.

14. A biomaterial matrix comprising an isolated, modified nucleic acid.

15. The biomaterial matrix of Claim 14, wherein the matrix comprises at least 50% nucleic acid by 5 weight.

16. The biomaterial matrix of Claim 14, wherein the matrix comprises at least 50% nucleic acid by volume.

17. The maxtix of Claim 14, wherein the 10 nucleic acid comprises at least 95% DNA per total nucleic acid.

18. The matrix of Claim 14, wherein the modified nucleic acid is modified in at least one manner selected from the group consisting of: capping, 15 crosslinking, methylation, ethylation and attachment of a protein or small molecule.

19. The matrix of Claim 14, further comprising a biodegradable copolymer.

20. The matrix of Claim 19, wherein the 20 biodegradable copolymer is selected from the group consisting of: polylactic acid, polyglycol alginate, polyglycolic acid, poly amino acids, polysaccharides, cellulose acetate, hyaluronic acid and collagen.

21. The matrix of Claim 14, wherein the matrix 25 comprises a hydrogel.

22. The matrix of Claim 14, wherein the matrix comprises a tissue scaffold.

23. The matrix of Claim 14, wherein the nucleic acid encodes a protein.

24. The matrix of Claim 23, wherein the protein is a wound healing factor.

25. A method of making a biomaterial matrix comprising:

isолating a nucleic acid;
modifying the nucleic acid; and
5 forming a biomaterial matrix.

26. The method of Claim 25, wherein the nucleic acid comprises at least 95% DNA per total nucleic acid.

27. The method of Claim 25, wherein the
10 modifying comprises at least one technique selected from the group consisting of: capping, crosslinking, methylation, ethylation, and attachment of a protein or small molecule.

28. The method of Claim 25, wherein forming
15 the biomaterial matrix further comprises:

freezing an aqueous solution of the nucleic acid;
and
lyophilizing the frozen aqueous solution.

29. The method of Claim 25, wherein forming
20 the biomaterial matrix further comprises:
preparing a solution of the nucleic acid; and
foaming the solution with supercritical carbon dioxide.

30. The method of Claim 25, wherein forming
25 the biomaterial matrix further comprises forming a hydrogel of the modified nucleic acid.

31. The method of Claim 25, further comprising adding a biodegradable copolymer to the modified nucleic acid.

32. The method of Claim 31, wherein the
5 biodegradable copolymer is selected from the group consisting of: polylactic acid, polyglycol alginate, polyglycolic acid, poly amino acids, polysaccharides, cellulose acetate, hyaluronic acid and collagen.

33. The method of Claim 25, wherein the
10 nucleic acid encodes a protein.

34. The method of Claim 33, wherein the nucleic acid encodes a wound healing factor.

35. A method for making a nucleic acid biomaterial comprising:

isolating a nucleic acid; and

modifying the nucleic acid;

5 forming a biodegradable polymer from the nucleic acid.

36. The method of Claim 35, wherein the nucleic acid biomaterial comprises at least 50% nucleic acid by weight.

10 37. The method of Claim 35, wherein the nucleic acid biomaterial comprises at least 50% nucleic acid by volume.

38. The method of Claim 35, wherein the nucleic acid comprises at least 95% DNA.

15 39. The method of Claim 35, wherein the biodegradable polymer is a drug carrier or wound dressing.

40. The method of Claim 35, wherein the modifying comprises at least one technique selected from
20 the group consisting of: capping, crosslinking, methylation, ethylation, and attachment of a protein or small molecule.

41. The method of Claim 35, further comprising adding a biodegradable copolymer to the modified nucleic
25 acid.

42. The method of Claim 41, wherein the biodegradable copolymer is selected from the group consisting of: polylactic acid, polyglycol alginate, polyglycolic acid, poly amino acids, polysaccharides, 5 cellulose acetate, hyaluronic acid and collagen.

43. The method of Claim 35, wherein the nucleic acid encodes a protein.

44. The method of Claim 43, wherein the nucleic acid encodes a wound healing factor.

45. A nucleic acid biomaterial comprising an isolated, modified nucleic acid.

46. The biomaterial of Claim 45, comprising at least 50% nucleic acid by weight.

5 47. The biomaterial of Claim 45, comprising at least 50% nucleic acid by volume.

48. The biomaterial of Claim 45, wherein the modified nucleic acid is modified in at least one manner selected from the group consisting of: capping, 10 crosslinking, methylation, ethylation and attachment of a protein or small molecule.

49. The biomaterial of Claim 45, wherein the modified nucleic acid comprises at least 95% DNA per total nucleic acid.

15 50. The biomaterial of Claim 45, further comprising a biodegradable copolymer.

51. The biomaterial of Claim 50, wherein the biodegradable copolymer is selected from the group consisting of: polylactic acid, polyglycol alginate, 20 polyglycolic acid, poly amino acids, polysaccharides, cellulose acetate, hyaluronic acid and collagen.